REMARKS

Claims 1-3, 8, 13, and 14 stand rejected under 35 U.S.C. 102(e) as being anticipated by Wu (USPN 6,665,301). In his "Response to Arguments" on page 12 of the present Office Action, the Examiner indicates that "Wu discloses setting up separate common independent virtual connections to connect the call. The virtual connection setup includes two edge network connections that connect a calling node and private nodes to a core public network and further include public network connections that connect the edge nodes of the core network together... These virtual connections are separate and independent connections as claimed."

Applicant disagrees with the Examiner's statement concerning the subject matter of Wu. The Examiner refers to column 4, lines 10-39 and Figure 1 of Wu in support of these positions. However, Wu is not concerned with a core network and an edge network and these terms are nowhere found in the Wu disclosure. The Examiner equates the core network with Wu's "virtual tunnel." However, the manner in which the virtual tunnel works is not described in sufficient detail to instruct the person skilled in the art in providing Applicant's claimed invention.

Nonetheless, to simplify prosecution and not as a concession of the applicability of Wu to the claimed invention, nor by way of creating any estoppel, Applicant has cancelled Claims 1-3, 8, 13, and 14 and replaces them with new Claims 26 and 27. Claims 4-7, 9, and 10 are also cancelled. Support for the claimed subject matter can be found in the specification as filed at least on pages 7 and 8.

A key problem addressed by the invention concerns quality of service (QoS) incurring on a mix of real time and non-real time traffic.. In the invention, the overall network is separated into two networks: the core network and the

edge network. The MPCS sits at the boundary of the edge and core networks. The edge network is networked between the end user device, *e.g.* a telephone, and the MPCS. The core network is a network between two or more MPCSs. The core network is comprised of a virtual private network (VPN) which, in turn, is comprised of multiple virtual trunks (VT). Each VT has a particular set of characteristics, *e.g.* quality of service (QoS), quantity of bandwidth, and cost. A VT is selected for use in a particular call based on these characteristics, *e.g.* one VT may have a high QoS for real time voice, another VT has a QoS and the necessary reserved bandwidth suitable for real time video, and another VT has large quantities of bandwidth with a low QoS suitable for non-real time data.

VTs of similar characteristics and/or protocols may be grouped together to form a VPN for administrative purposes. Thus, the core network may consist of multiple VPNs, each VPN being of a particular protocol and/or having a particular set of characteristics.

The terms "virtual trunk (VT)" and "virtual circuit (VC)" are abstract terms used to describe network connections that are independent of the underlying protocol used to create the network connection. The specific protocol terminology may vary, for example, an MPLS connection can be called a "Label Switched Path (LSP)," an ATM connection can be called a "Switched Virtual Circuit (SVC)" or a "Switched Virtual Path (SVP)," a TCP/IP connection can be called a "TCP channel." For the purpose of the invention, any network connection can be referred to as a VC or VT.

Additionally; two different terms were required to distinguish a network connection in the edge network from a network connection in the core network; "virtual circuit" was selected to describe a network connection in the edge network, and "virtual trunk" was selected to describe a network connection in the core network. The use of two different terms does not indicate any fundamental differences between a VC and a VT. A VC composed of an MPLS LSP may be

identical in nature to a VT composed of another MPLS LSP, whereas a VC composed of an MPLS LSP is fundamentally different from a VC composed of an ATM AAL2 SVC.

A key feature of the invention is the separation of the core network from the edge network, both in terms of protocol types and characteristics, and in temporal terms. This separation enables the management of the core network independently of the edge network. This further enables the provision of such features as:

Guaranteed bandwidth when requested by the edge networks, *e.g.* when a call is placed the bandwidth has already been reserved for it in the core VTs;

Reduced call setup times and reduced chance of call blocking as the bandwidth is pre-allocated and reserved;

Capacity management;

Advanced notice/alarms before network reaches capacity or QoS degrades, *e.g.* if the core VPN reaches capacity, an alarm is raised and more VTs are created, before they are needed by the edge network;

Cost savings through accurate and controlled use of bandwidth *e.g.* no need to overprovision or reserve excess bandwidth;

VPNs automatically grow and shrink based on real-world traffic patterns, surges in traffic are handled automatically without degrading QoS;

Intelligent network predicts future demand and automatically adjusts to cope with the expected demand or lack of, e.g. VTs can be created or destroyed based on expected or past demand

The network automatically recognizes and accounts for local variations in traffic patterns, *e.g.* average traffic between MPCS A and MPCS B may be greater than that between MPCS A and MPCS C, thus VT A-B has more reserved bandwidth than VT A-C;

Network fault tolerance;

Flexibility through support for multiple protocols and transport; and

Simplifies network engineering through automated VPNs.

Ordinary networks which do not avail themselves of the MPCS, such as that described in Wu, cannot provide these benefits because there is no clear separation of edge and core networks. A call request using Wu's network initiates the creation of a VC from the end device, *e.g.* a telephone, to an edge ATM switch which, in turn, passes the request through one or more core ATM switches in real time, and through to the destination edge device. Forcing the setup of the VC through the entire network at the time of the call means that if the necessary QoS, bandwidth, or network switches are not available, the call fails. There is no provision for setting up the core network VCs in advance of and independently of the call.

At call completion, an endpoint using a network such as Wu destroys the virtual circuit from endpoint to endpoint through the entire network. An MPCS network instead has the option of keeping the VT that was used in the call in existence so that it can be immediately used for another call. A VT may also be used to transport data for multiple calls simultaneously, so that when a call ends and an edge network VC is destroyed, the core VT involved in the call releases some of its bandwidth but continues transporting data for other active calls. A network using Wu does not have this flexibility of use and cannot avail itself of the benefits inherent in this model.

Additionally, an endpoint setting up a call in Wu's network must rely on having ATM connectivity through the entire network from endpoint to endpoint. If an ATM is not available at any point in the network the call fails. An endpoint using an MPCS network, on the other hand, can make a call to the nearest MPCS using whatever protocol the endpoint supports, *e.g.* ATM. If an ATM VT exists in the VPN, then the MPCS can route the call data to this VT. If an ATM is not currently available in the VPN, however, the MPCS can select another VT with the same characteristics as the requested ATM e.g. an MPLS VT, convert the call data from ATM to MPLS, and route the call on the MPLS VT. This also

enables an endpoint to communicate with any other endpoint, regardless of the protocol supported by each endpoint. An ATM endpoint can communicate with an MPLS or a TCP/IP endpoint without any changes having to be made to the endpoint. An endpoint on Wu's network, however, must support ATM and can only communicate with other ATM endpoints, thus severely restricting the possible uses of the endpoint.

Failure to provide temporal separation of edge and core networks also results in a network as described in Wu being more expensive because there is no flexibility in choosing among multiple VTs with different costs or in sharing costs with other endpoints through the use of bulk bandwidth VTs; and in being more prone to faults because the state of the network is realized only at the time of the call. Using the MPCS to separate the core and edge network in temporal terms results in the advance creation of VTs, and thus in the advance notification of any failures or issues in the network, thereby providing time to correct the problem before a request for a call is made.

Additionally, Wu is concerned with setting up connections within an ATM network. The MPCS-based network consists of many protocols in addition to that described in Wu, such as MPLS and TCP/IP. When ATM is required in the core network provided by a set of MPCSs, the ATM VT between two MPCSs could in fact use Wu to set up Wu's virtual tunnel between the two MPCSs. This virtual tunnel may traverse multiple ATM switches as described in Wu, and may consist at the ATM network level of multiple ATM connections, *i.e.* a chain of connections from ATM switch to ATM switch until the destination MPCS is reached. This is similar to setting up an MPLS VT between two MPCSs. Multiple MPLS switches may be involved in setting up the MPLS VT, with a separate MPLS connection between each MPLS switch. Similarly, if the VT between two MPCSs is a TCP/IP VT, the actual VT may traverse multiple IP routers, the concatenation of each IP connection creating the TCP/IP VT used by the MPCSs. It is through the use of standard and existing network connection

methods, such as Wu, MPLS standards, and TCP/IP standards that make the creation of the core network VPN possible.
This manner in which the core network is created and managed separately from the edge network, and how the core network is interfaced with the edge network makes the MPCS invention novel.

Key features of any network connection, as it pertains to the invention, are its characteristics, such as QoS, bandwidth, cost, and availability, not its protocol. A VT composed of Wu's ATM may be suitable for a particular purpose at a given moment, and thus could be used to create a core VT and added to the VPN. Over time, however, as user requirements change and new technologies evolve, the Wu ATM VT may no longer be the best form of VT for a given purpose. In such a case, the Wu ATM VT can be replaced in the VPN by another more suitable VT, such as an MPLS VT, without affecting the edge network in any way.

An endpoint used with the invention may take many forms depending on its intended use. A common type of endpoint used with the invention is a telephone. Other endpoint types that could be used with the invention include, but are not limited to, video phones, fax machines, data backup services, and Web browsers. Each endpoint type may have different requirements in terms of QoS, bandwidth, cost, and others.

Additionally, an endpoint commonly uses a single VC from the endpoint to an MPCS. The invention does not restrict the endpoint to using a single VC. A multi-line telephone, for example, could use several VCs to an MPCS. An endpoint may also have two or more VCs to two or more MPCSs, for example, to ensure network connectivity in the event of one MPCS failing.

The specific architecture now claimed is not found in the art of the record and the application is therefore deemed to be in allowable condition.

Should the Examiner deem it helpful, he is encouraged to contact applicant's attorney, Michael A. Glenn at (650) 474-8400.

Respectfully submitted,

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